State of New Jersey
James E. McGreevey, Governor

# 2002 FISH IBI REPORT

Volume 2 of 2

New Jersey Department of Environmental Protection
Bradley M. Campbell, Commissioner

April 2004

NJ Department of Environmental Protection
P.O. Box 427, Trenton, NJ 08625-0427

WATER MONITORING AND STANDARDS
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Bureau of Freshwater & Biological Monitoring
Alfred L. Korndoerfer, Jr., Chief

**April 2004**

# 2002 FISH IBI REPORT

Volume 2 of 2

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**FISH IDENTIFICATIONS**
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Confirmation by: Philadelphia Academy of Natural Sciences

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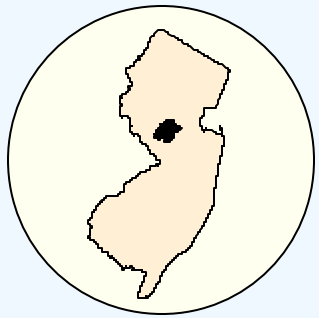
**SPECIAL ACKNOWLEDGEMENT FOR ASSISTANCE**
James Kurtenbach, U.S. EPA Region 2

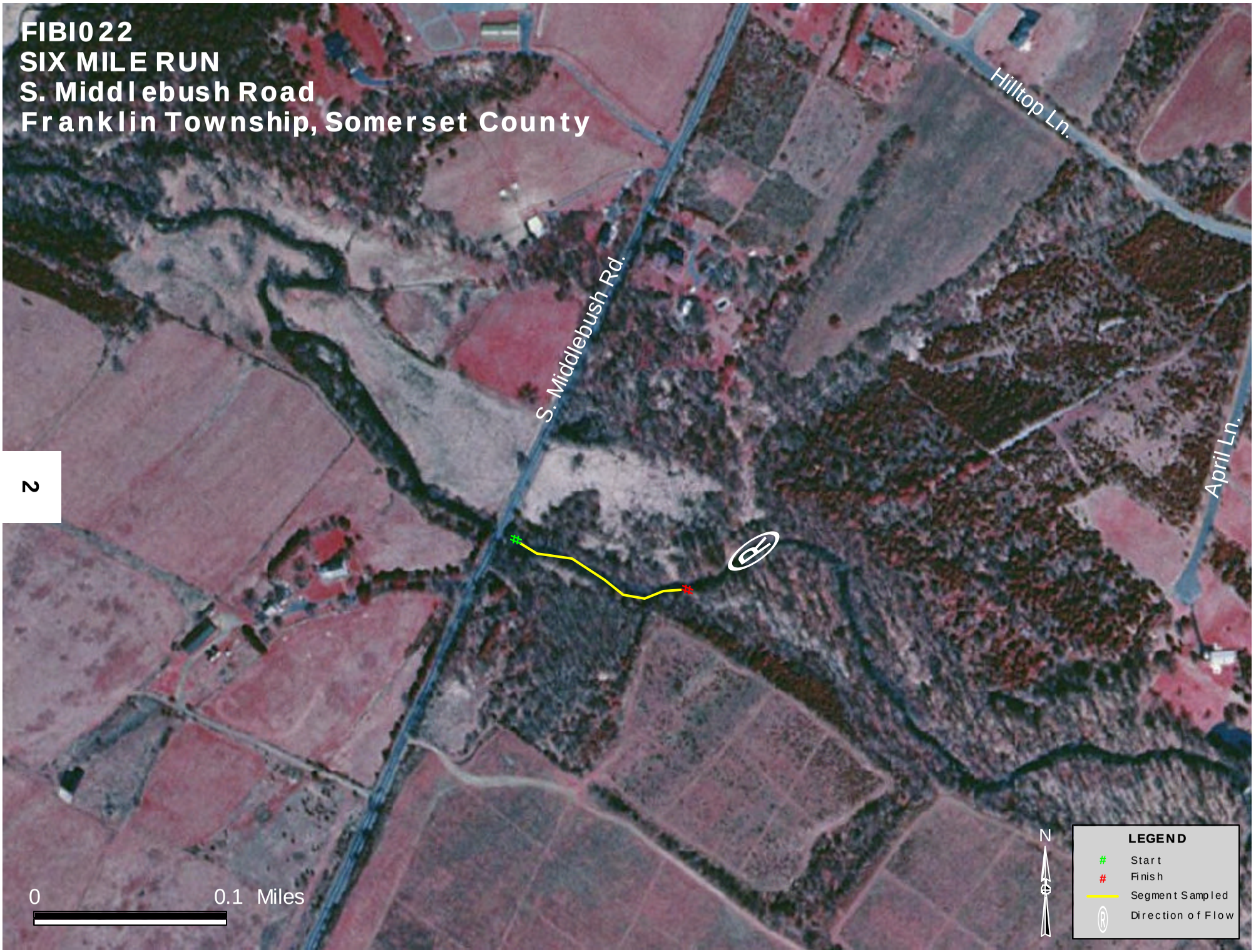
# Six Mile Run - FIBI022

S FIBI Sampling Location
Small Streams (1st and 2nd Order)
Large Streams (3rd Order and Above)

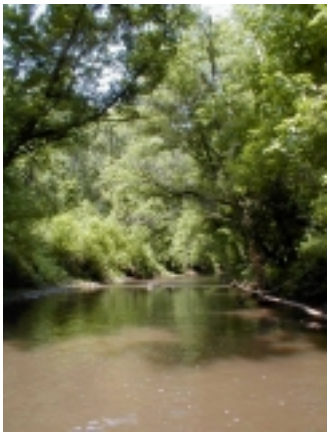
N

0 1 2 3 4 Miles


FIBI022
SIX MILE RUN
S. Middlebush Road
Franklin Township, Somerset County
Hilltop Ln.
S. Middlebush Rd.
April Ln.
2
0
0.1 Miles
N
LEGEND
Start
Finish
Segment Sampled
Direction of Flow

# SUMMARY OF RESULTS

## FIBI022 - Six Mile Run



| | |
|---|---|
| 1. Stream Name: | Six Mile Run |
| 2. Sampling Date: | 06-10-2002 |
| 3. Sampling Location: | S Middlebush Rd (40 28 11.21; -74 32 39.14) |
| 4. Municipality: | Franklin Twp. |
| 5. County: | Somerset |
| 6. Watershed Management Area: | 10 |
| 7. Contributing Drainage Area: | 11.1 Square Miles |
| 8. Electrofishing Gear: | 2 Backpack |
| 9. FIBI Score and Rating: | 36 - Fair |
| 10. Habitat Score and Rating: | 145 - Suboptimal |
| 11. Fishable Species Present: | Yes |
| 12. Relevant AMNET[1] Station Data | |
| Proximity of FIBI station to AMNET station: | 1.6 mi upstream AN0409 |
| AMNET Rating: | Round 1 – MODERATE; Round 2 – MODERATE |
| 13. Stream Chemistries | |
| Dissolved Oxygen: | 7.9 mg/L |
| Temperature: | 18.1 $^{0}$C |
| pH: | 7.4 |
| Conductivity: | 253 µmhos/cm |
| 14. Number of Fish with Anomalies: | 0 |
| 15. Length of Stream Segment Sampled: | 150 Meters |
| 16. Water Clarity: | Clear |
| 17. Average Open Forest Canopy: | 16% |
| 18. Discharge: | 38.3 ft.$^{3}$/sec |
| 19. Substrate: | 80% Gravel and Sand, 15% Cobble, 0% Boulder, 0% Clay, 5% Silt |
| 20. Habitat: | 40% Riffle, 45% Run, 15% Pool |
| 21. Snags: | No |
| 22. Periphyton: | None |
| 23. Submerged Aquatic Vegetation: | No |
| 24. Other Observations: | |
| 25. Number of Fish Species Identified: | 16 |
| 26. Total Number of Fish Collected: | 140 |

[1] AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

# FIBI022 06-10-2002

Six Mile Run

## LISTED IN ORDER OF ABUNDANCE FOUND

| COMMON NAME | SCIENTIFIC NAME | # FOUND | SIZE RANGE (INCHES) |
|---|---|---|---|
| Tesselated Darter | *Etheostoma olmstedi* | 43 | |
| Creek Chub | *Semotilus atromaculatus* | 25 | |
| White Sucker* | *Catostomus commersoni* | 17 | |
| American Eel* | *Anguilla rostrata* | 14 | |
| Common Shiner | *Luxilus cornutus* | 10 | |
| Redbreast Sunfish* | *Lepomis auritus* | 10 | 1.4-5.1 |
| Longnose Dace | *Rhinichthys cataractae* | 6 | |
| Redfin Pickerel* | *Esox americanus americanus* | 3 | 2.0-6.7 |
| Spottail Shiner | *Notropis hudsonius* | 3 | |
| Green Sunfish* | *Lepomis cyanellus* | 2 | 2.8-4.3 |
| Yellow Bullhead* | *Ameiurus natalis* | 2 | 8.7-9.1 |
| Banded Killifish | *Fundulus diaphanus* | 1 | |
| Blacknose Dace | *Rhinichthys atratulus* | 1 | |
| Largemouth Bass* | *Micropterus salmoides* | 1 | 3.9 |
| Pumpkinseed* | *Lepomis gibbosus* | 1 | 5.7 |
| Swallowtail Shiner | *Notropis procne* | 1 | |

* Regulated as a fishable species under current New Jersey Fish and Wildlife code

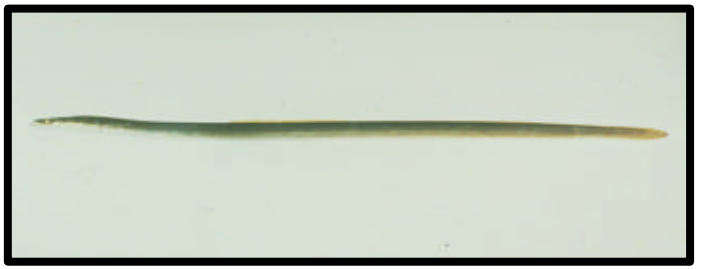
# Species Identified at Six Mile Run (FIBI022)

(Not to Scale)

John Scarola

**Blacknose Dace**

John Scarola



**American Eel**

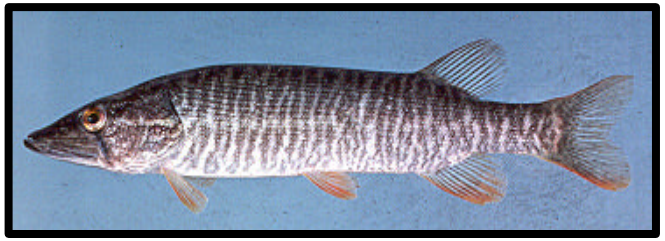
John Scarola

**White Sucker**

Konrad Schmidt

**Creek Chub**

Jenkins & Burkhea



**Redfin Pickerel**

AFS

**Largemouth Bass**

# Species Identified at Six Mile Run (FIBI022)

(Not to Scale)

John Scarola

**Pumpkinseed**

John Scarola

**Redbreast Sunfish**

John Scarola

**Tesselated Darter**

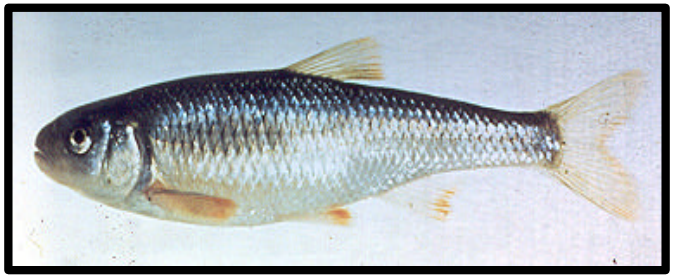
Konrad Schmidt

**Green Sunfish**

John Scarola

**Yellow Bullhead**

John Scarola

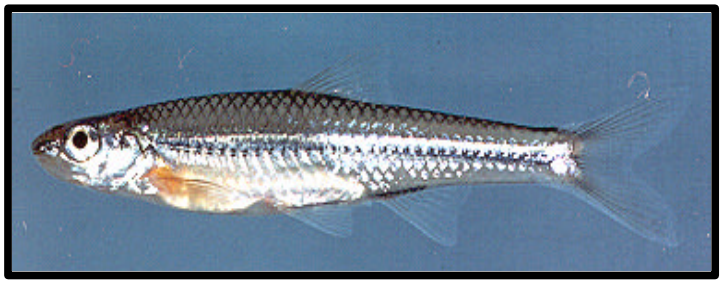


**Common Shiner**

# Species Identified at Six Mile Run (FIBI022)

(Not to Scale)

Jenkins & Burkhead



**Swallowtail Shiner**

Konrad Schmidt

**Spottail Shiner**

Schute

**Longnose Dace**

John Scarola

**Banded Killifish**

**FIBI022 - Six Mile Run @ Middlebush Road** Excellent Good **Fair** Poor

**Date Sampled - 6/10/02**

| | **Score** |
|---|---|
| # of Fish Species | 5 |
| # of Benthic Insectivorous Species (BI) | 5 |
| # of Trout and Centrarchid Species (trout, bass, sunfish, crappie) | 5 |
| # of Intolerant Species (IS) | 1 |
| Proportion of Individuals as White Suckers | 3 |
| Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish) | 3 |
| Proportion of Individuals as Insectivorous **Cyprinids** (I and BI) | 3 |
| Proportion of Individuals as Trout *whichever gives better score | |
| OR | |
| Proportion of Individuals as Pisciviores (Excluding American Eel)* | 3 |
| Number of Individuals in Sample | 3 |
| Proportion of Individuals w/disease/anomalies (excluding blackspot) | 5 |
| Total | **36** |

**Stream Rating**

| | |
|---|---|
| **45-50** | **Excellent** |
| **37-44** | **Good** |
| **29-36** | **Fair** |
| **10-28** | **Poor** |

# HABITAT ASSESSMENT FOR *HIGH* GRADIENT STREAMS — Six Mile Run (FIBI022) – 6/10/02

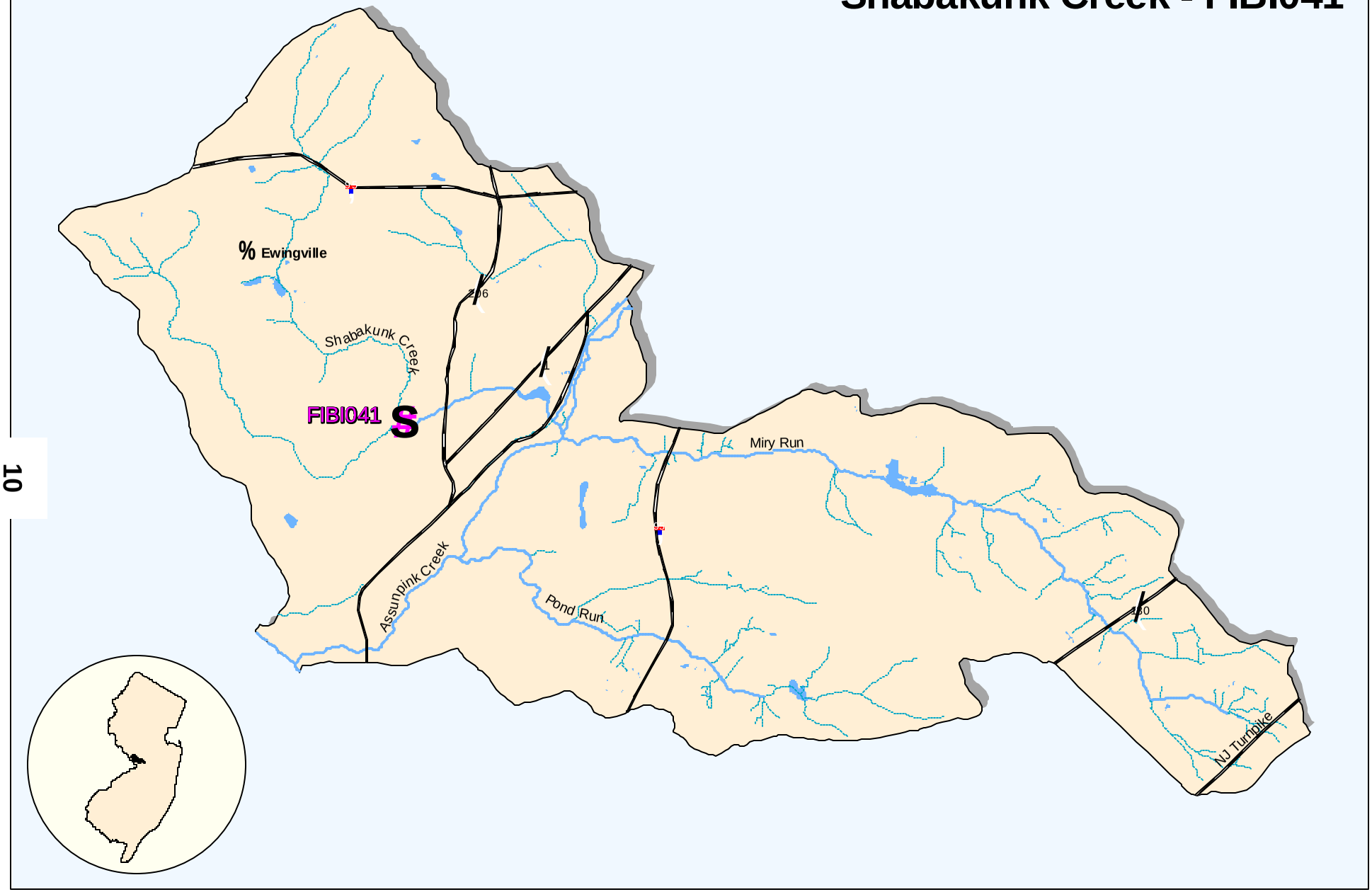
| | Condition Category | | | |
|---|---|---|---|---|
| | **Optimal** | **Suboptimal** | **Marginal** | **Poor** |
| **1. Epifaunal Substrate /Available Cover** | Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient). | 40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale). | 20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed. | Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking. |
| **SCORE 15** | 20 19 18 17 16 | **15** 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| **2. Embeddedness** | Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space | Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment. | Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment. | Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment. |
| **SCORE 7** | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 **7** 6 | 5 4 3 2 1 0 |
| **3. Velocity/Depth Regimes** | All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m) | Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes). | Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low). | Dominated by 1 velocity / depth regime (usually slow-deep). |
| **SCORE 18** | 20 19 **18** 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| **4. Sediment Deposition** | Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition. | Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools. | Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent. | Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition. |
| **SCORE 6** | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 **6** | 5 4 3 2 1 0 |
| **5. Channel Flow Status** | Water reaches base of both lower banks, and minimal amount of channel substrate is exposed. | Water fills >75% of the available channel; or <25% of channel substrate is exposed. | Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed. | Very little water in channel and mostly present as standing pools. |
| **SCORE 15** | 20 19 18 17 16 | **15** 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| **6. Channel Alteration** | Channelization or dredging absent or minimal; stream with normal pattern. | Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present. | Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted. | Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely. |
| **SCORE 20** | **20** 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| **7. Frequency of Riffles** (or bends) | Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important. | Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15. | Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25. | Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25. |
| **SCORE 18** | 20 19 **18** 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| **8. Bank Stability** (score each bank) Note: determine left or right side by facing downstream. | Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected. | Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion. | Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods. | Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars. |
| SCORE ___**5**___ (LB) Left | 10 9 | 8 7 6 | **5** 4 3 | 2 1 0 |
| SCORE ___**5**___ (RB) Right | 10 9 | 8 7 6 | **5** 4 3 | 2 1 0 |
| **9. Bank Vegetative Protection** (score each bank) | More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally. | 70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining. | 50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining. | Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height. |
| SCORE ___**8**___ (LB) Left | 10 9 | **8** 7 6 | 5 4 3 | 2 1 0 |
| SCORE ___**8**___ (RB) Right | 10 9 | **8** 7 6 | 5 4 3 | 2 1 0 |
| **10. Riparian Vegetative Zone Width** (score each bank riparian zone) | Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone. | Width of riparian zone 12-18 meters; human activities have impacted zone only minimally. | Width of riparian zone 6-12 meters; human activities have impacted zone a great deal. | Width of riparian zone <6 meters: little or no riparian vegetation due to human activities. |
| SCORE ___**10**___ (LB) Left | **10** 9 | 8 7 6 | 5 4 3 | 2 1 0 |
| SCORE ___**10**___ (RB) Right | **10** 9 | 8 7 6 | 5 4 3 | 2 1 0 |

**HABITAT SCORE**

**145**

| HABITAT SCORES | VALUE |
|---|---|
| OPTIMAL | 160 ? 200 |
| **SUB-OPTIMAL** | **110 ? 159** |
| MARGINAL | 60 ? 109 |
| POOR | < 60 |

# Shabakunk Creek - FIBI041

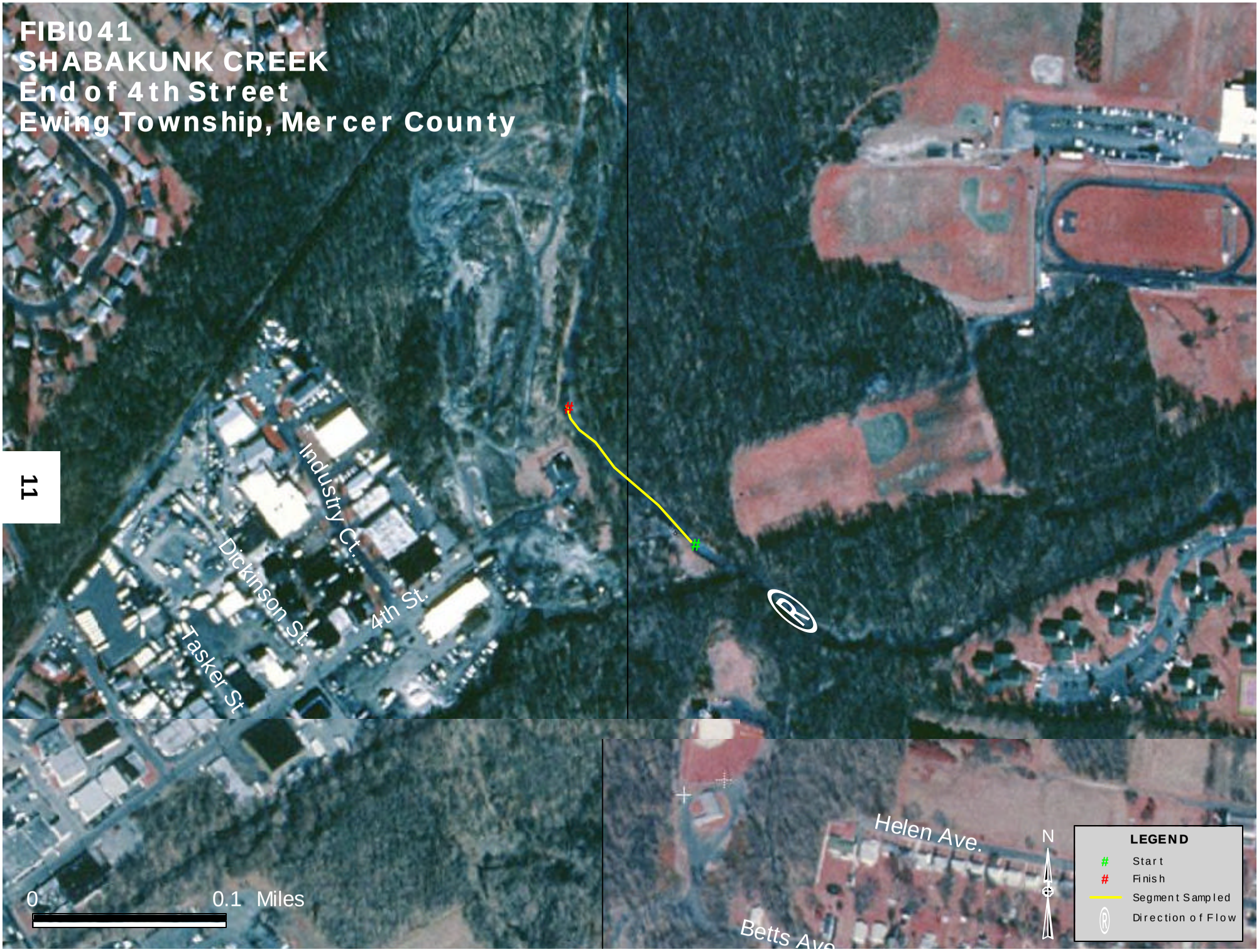



10

S FIBI Sampling Location
Small Streams (1st and 2nd Order)
Large Streams (3rd Order and Above)

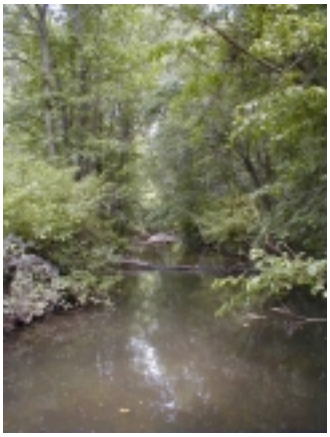
N

0 1 2 3 Miles


FIBI041
SHABAKUNK CREEK
End of 4th Street
Ewing Township, Mercer County
11
Industry Ct.
Dickinson St.
4th St.
Tasker St
Helen Ave.
Betts Ave
N
0
0.1 Miles
LEGEND
Start
Finish
Segment Sampled
Direction of Flow

# SUMMARY OF RESULTS

## FIBI041 - Shabakunk Creek



| | |
|---|---|
| 1. Stream Name: | Shabakunk Creek |
| 2. Sampling Date: | 06-04-2002 |
| 3. Sampling Location: | End of Fourth St (40 15 06.49; -74 45 00.19) |
| 4. Municipality: | Ewing Twp. |
| 5. County: | Mercer |
| 6. Watershed Management Area: | 11 |
| 7. Contributing Drainage Area: | 6.1 Square Miles |
| 8. Electrofishing Gear: | 2 Backpack |
| 9. FIBI Score and Rating: | 38 - Good |
| 10. Habitat Score and Rating: | 132 - Suboptimal |
| 11. Fishable Species Present: | Yes |
| 12. Relevant AMNET[1] Station Data | |
| Proximity of FIBI station to AMNET station: | 0.5 mi upstream AN0114 |
| AMNET Rating: | Round 1 – MODERATE; Round 2 – MODERATE |
| 13. Stream Chemistries | |
| Dissolved Oxygen: | 6.7 mg/L |
| Temperature: | 17.2 $^{0}$C |
| pH: | 7.3 |
| Conductivity: | 366 µmhos/cm |
| 14. Number of Fish with Anomalies: | 1 |
| 15. Length of Stream Segment Sampled: | 150 Meters |
| 16. Water Clarity: | Clear |
| 17. Average Open Forest Canopy: | 23% |
| 18. Discharge: | NA ft.$^{3}$/sec |
| 19. Substrate: | 85% Gravel and Sand, 5% Cobble, 0% Boulder, 0% Clay, 10% Silt |
| 20. Habitat: | 5% Riffle, 70% Run, 25% Pool |
| 21. Snags: | Yes |
| 22. Periphyton: | None |
| 23. Submerged Aquatic Vegetation: | No |
| 24. Other Observations: | flow meter not working |
| 25. Number of Fish Species Identified: | 15 |
| 26. Total Number of Fish Collected: | 280 |

[1] AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

# FIBI041 06-04-2002

Shabakunk Creek

## LISTED IN ORDER OF ABUNDANCE FOUND

| COMMON NAME | SCIENTIFIC NAME | # FOUND | SIZE RANGE (INCHES) |
|---|---|---|---|
| Creek Chub | *Semotilus atromaculatus* | 50 | |
| Spottail Shiner | *Notropis hudsonius* | 45 | |
| White Sucker* | *Catostomus commersoni* | 37 | |
| Swallowtail Shiner | *Notropis procne* | 25 | |
| Redbreast Sunfish* | *Lepomis auritus* | 23 | 1.4-6.5 |
| Tesselated Darter | *Etheostoma olmstedi* | 19 | |
| Banded Killifish | *Fundulus diaphanus* | 15 | |
| Blacknose Dace | *Rhinichthys atratulus* | 12 | |
| Satinfin Shiner | *Cyprinella analostana* | 12 | |
| American Eel* | *Anguilla rostrata* | 10 | |
| Green Sunfish* | *Lepomis cyanellus* | 9 | 3.7-5.5 |
| Bluegill* | *Lepomis macrochirus* | 8 | 1.2-2.2 |
| Common Shiner | *Luxilus cornutus* | 7 | |
| Pumpkinseed* | *Lepomis gibbosus* | 7 | 2.8-4.9 |
| Rock Bass* | *Ambloplites rupestris* | 1 | 6.9 |

* Regulated as a fishable species under current New Jersey Fish and Wildlife code

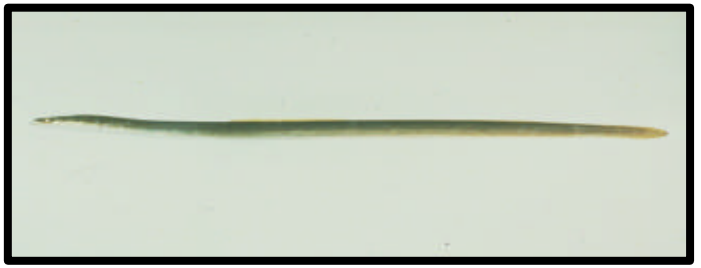
# Species Identified at Shabakunk Creek (FIBI041)

(Not to Scale)

John Scarola

**Blacknose Dace**

John Scarola



**American Eel**

John Scarola

**White Sucker**

Konrad Schmidt

**Creek Chub**

Jenkins & Burkhead

**Satinfin Shiner**

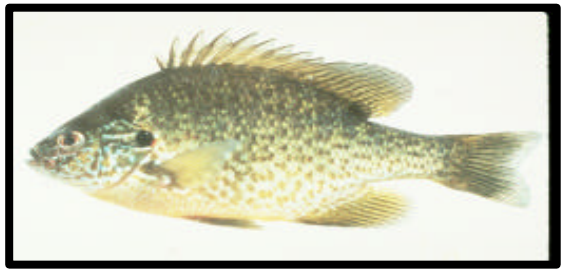
John Scarola

**Bluegill**

# Species Identified at Shabakunk Creek (FIBI041)

(Not to Scale)

John Scarola



**Pumpkinseed**

John Scarola

**Redbreast Sunfish**

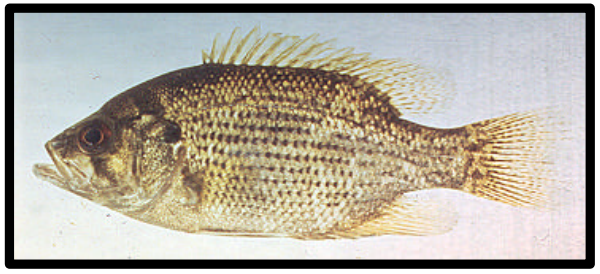
John Scarola

**Tesselated Darter**

Konrad Schmidt

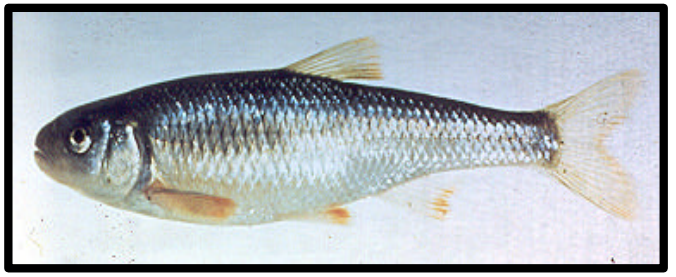
**Green Sunfish**

John Scarola



**Rock Bass**

John Scarola

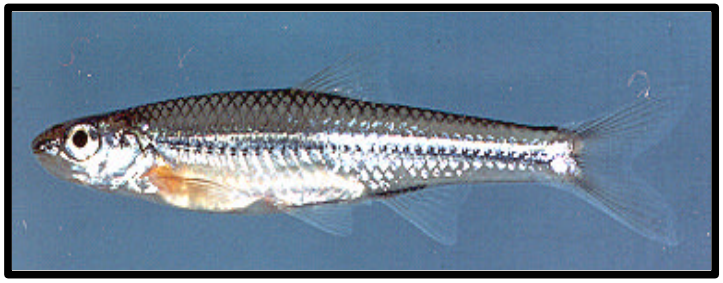


**Common Shiner**

# Species Identified at Shabakunk Creek (FIBI041)

(Not to Scale)

Jenkins & Burkhead



**Swallowtail Shiner**

Konrad Schmidt

**Spottail Shiner**

John Scarola

**Banded Killifish**

**These large gravel bars give some indication that Shabakunk Creek is undergoing considerable hydrological changes.**

**FIBI041 - Shabakunk Creek @ End of 4th Street** Excellent **Good** Fair Poor

**Date Sampled - 8/28/2001**

| | **Score** |
|---|---|
| # of Fish Species | 5 |
| # of Benthic Insectivorous Species (BI) | 5 |
| # of Trout and Centrarchid Species (trout, bass, sunfish, crappie) | 5 |
| # of Intolerant Species (IS) | 1 |
| Proportion of Individuals as White Suckers | 3 |
| Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish) | 3 |
| Proportion of Individuals as Insectivorous **Cyprinids** (I and BI) | 5 |
| Proportion of Individuals as Trout *whichever gives better score | |
| OR | |
| Proportion of Individuals as Pisciviores (Excluding American Eel)* | 1 |
| Number of Individuals in Sample | 5 |
| Proportion of Individuals w/disease/anomalies (excluding blackspot) | 5 |
| Total | **38** |

**Stream Rating**

| | |
|---|---|
| **45-50** | **Excellent** |
| **37-44** | **Good** |
| **29-36** | **Fair** |
| **10-28** | **Poor** |

# HABITAT ASSESSMENT FOR *HIGH* GRADIENT STREAMS Shabakunk Creek (FIBI041) – 6/4/02

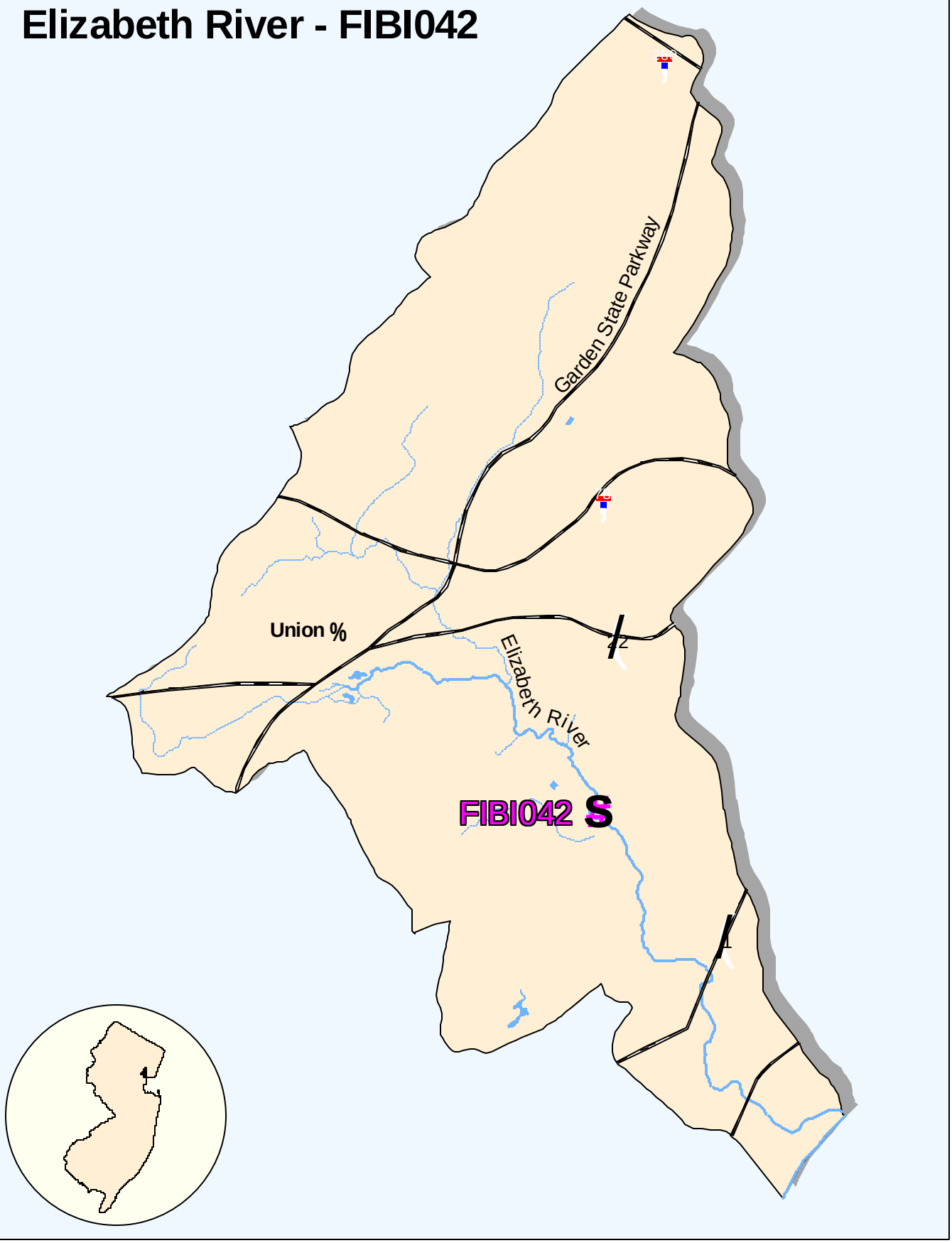
| | Condition Category | | | |
|---|---|---|---|---|
| | **Optimal** | **Suboptimal** | **Marginal** | **Poor** |
| **1. Epifaunal Substrate /Available Cover** | Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient). | 40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale). | 20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed. | Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking. |
| **SCORE 16** | 20 19 18 17 **16** | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| **2. Embeddedness** | Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space | Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment. | Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment. | Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment. |
| **SCORE 14** | 20 19 18 17 16 | 15 **14** 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| **3. Velocity/Depth Regimes** | All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m) | Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes). | Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low). | Dominated by 1 velocity / depth regime (usually slow-deep). |
| **SCORE 16** | 20 19 18 17 **16** | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| **4. Sediment Deposition** | Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition. | Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools. | Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent. | Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition. |
| **SCORE 12** | 20 19 18 17 16 | 15 14 13 **12** 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| **5. Channel Flow Status** | Water reaches base of both lower banks, and minimal amount of channel substrate is exposed. | Water fills >75% of the available channel; or <25% of channel substrate is exposed. | Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed. | Very little water in channel and mostly present as standing pools. |
| **SCORE 18** | 20 19 **18** 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| **6. Channel Alteration** | Channelization or dredging absent or minimal; stream with normal pattern. | Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present. | Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted. | Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely. |
| **SCORE 17** | 20 19 18 **17** 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| **7. Frequency of Riffles** (or bends) | Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important. | Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15. | Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25. | Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25. |
| **SCORE 8** | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 **8** 7 6 | 5 4 3 2 1 0 |
| **8. Bank Stability** (score each bank) Note: determine left or right side by facing downstream. | Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected. | Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion. | Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods. | Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars. |
| SCORE ___**4**___ (LB) | Left 10 9 | 8 7 6 | 5 **4** 3 | 2 1 0 |
| SCORE ___**4**___ (RB) | Right 10 9 | 8 7 6 | 5 **4** 3 | 2 1 0 |
| **9. Bank Vegetative Protection** (score each bank) | More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally. | 70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining. | 50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining. | Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height. |
| SCORE ___**8**___ (LB) | Left 10 9 | **8** 7 6 | 5 4 3 | 2 1 0 |
| SCORE ___**4**___ (RB) | Right 10 9 | 8 7 6 | 5 **4** 3 | 2 1 0 |
| **10. Riparian Vegetative Zone Width** (score each bank riparian zone) | Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone. | Width of riparian zone 12-18 meters; human activities have impacted zone only minimally. | Width of riparian zone 6-12 meters; human activities have impacted zone a great deal. | Width of riparian zone <6 meters: little or no riparian vegetation due to human activities. |
| SCORE ___**9**___ (LB) | Left 10 **9** | 8 7 6 | 5 4 3 | 2 1 0 |
| SCORE ___**2**___ (RB) | Right 10 9 | 8 7 6 | 5 4 3 | **2** 1 0 |

**HABITAT SCORE**

**132**

| HABITAT SCORES | VALUE |
|---|---|
| OPTIMAL | 160 – 200 |
| **SUB-OPTIMAL** | **110 – 159** |
| MARGINAL | 60 – 109 |
| POOR | < 60 |

# Elizabeth River - FIBI042




**S** FIBI Sampling Location
Small Streams (1st and 2nd Order)
Large Streams (3rd Order and Above)

N

0.5 1 1.5 2 Miles


FIBI042
ELIZABETH RIVER
North Avenue
Hillside Township, Union County
21
Irvington Ave.
Riverside Dr.
North Ave
Morris Ave.
0
0.1 Miles
N
LEGEND
Start
Finish
Segment Sampled
Direction of Flow

# SUMMARY OF RESULTS

## FIBI042 - Elizabeth River

| | |
|---|---|
| 1. Stream Name: | Elizabeth River |
| 2. Sampling Date: | 06-20-2002 |
| 3. Sampling Location: | North Ave (40 40 39.37; -74 13 31.52) |
| 4. Municipality | Hillside Twp. |
| 5. County: | Union |
| 6. Watershed Management Area: | 7 |
| 7. Contributing Drainage Area: | 13.8 Square Miles |
| 8. Electrofishing Gear: | 2 Backpack |
| 9. FIBI Score and Rating: | 26 - Poor |
| 10. Habitat Score and Rating: | 87 - Marginal |
| 11. Fishable Species Present: | Yes |
| 12. Relevant AMNET[1] Station Data | |
| Proximity of FIBI station to AMNET station: | AN0204 |
| AMNET Rating: | Round 1 – SEVERE; Round 2 – NA |
| 13. Stream Chemistries | |
| Dissolved Oxygen: | 6.7 mg/L |
| Temperature: | 19.7 $^{0}$C |
| pH: | 7 |
| Conductivity: | 678 µmhos/cm |
| 14. Number of Fish with Anomalies: | 0 |
| 15. Length of Stream Segment Sampled: | 150 Meters |
| 16. Water Clarity: | Clear |
| 17. Average Open Forest Canopy: | 100% |
| 18. Discharge: | 23.22 ft.$^{3}$/sec |
| 19. Substrate: | 50% Gravel and Sand, 10% Cobble, 0% Boulder, 20% Clay, 20% Silt |
| 20. Habitat: | 10% Riffle, 20% Run, 70% Pool |
| 21. Snags: | No |
| 22. Periphyton: | Moderate |
| 23. Submerged Aquatic Vegetation: | Yes |
| 24. Other Observations: | Filamentous Algae Abundant |
| 25. Number of Fish Species Identified: | 5 |
| 26. Total Number of Fish Collected: | 256 |

[1] AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

# FIBI042 06-20-2002

Elizabeth River

## LISTED IN ORDER OF ABUNDANCE FOUND

| COMMON NAME | SCIENTIFIC NAME | # FOUND | SIZE RANGE (INCHES) |
|---|---|---|---|
| Mummichog | *Fundulus heteroclitus* | 180 | |
| Banded Killifish | *Fundulus diaphanus* | 71 | |
| Fathead Minnow | *Pimephales promelas* | 3 | |
| Pumpkinseed* | *Lepomis gibbosus* | 1 | 3.0 |
| Western Mosquito Fish | *Gambusia affinis* | 1 | |

* Regulated as a fishable species under current New Jersey Fish and Wildlife codes

# Species Identified at Elizabeth River (FIBI042)

(Not to Scale)

John Scarola

**Mummichog**

Robert McDowall


**Western Mosquito Fish**

William Roston

**Fathead Minnow**

John Scarola

**Banded Killifish**

John Scarola

**Pumpkinseed**

**The severely eroded streambanks of the Elizabeth River impact water quality and jeopardize the structural integrity of stormwater outfalls.**

**FIBI042 - Elizabeth River @ North Avenue** Excellent Good Fair **Poor**

**Date Sampled - 6/20/2002**

| | **Score** |
|---|---|
| # of Fish Species | 3 |
| # of Benthic Insectivorous Species (BI) | 1 |
| # of Trout and Centrarchid Species (trout, bass, sunfish, crappie) | 1 |
| # of Intolerant Species (IS) | 1 |
| Proportion of Individuals as White Suckers | 5 |
| Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish) | 3 |
| Proportion of Individuals as Insectivorous **Cyprinids** (I and BI) | 1 |
| Proportion of Individuals as Trout *whichever gives better score | |
| OR | |
| Proportion of Individuals as Pisciviores (Excluding American Eel)* | 1 |
| Number of Individuals in Sample | 5 |
| Proportion of Individuals w/disease/anomalies (excluding blackspot) | 5 |
| Total | **26** |

**Stream Rating**

| | |
|---|---|
| **45-50** | **Excellent** |
| **37-44** | **Good** |
| **29-36** | **Fair** |
| **10-28** | **Poor** |

# HABITAT ASSESSMENT FOR *HIGH* GRADIENT STREAMS  Elizabeth River (FIBI042) – 6/20/02

| | Condition Category | | | |
|---|---|---|---|---|
| | **Optimal** | **Suboptimal** | **Marginal** | **Poor** |
| **1. Epifaunal Substrate /Available Cover** | Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient). | 40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale). | 20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed. | Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking. |
| **SCORE 8** | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 **8** 7 6 | 5 4 3 2 1 0 |
| **2. Embeddedness** | Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space | Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment. | Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment. | Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment. |
| **SCORE 11** | 20 19 18 17 16 | 15 14 13 12 **11** | 10 9 8 7 6 | 5 4 3 2 1 0 |
| **3. Velocity/Depth Regimes** | All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m) | Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes). | Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low). | Dominated by 1 velocity / depth regime (usually slow-deep). |
| **SCORE 8** | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 **8** 7 6 | 5 4 3 2 1 0 |
| **4. Sediment Deposition** | Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition. | Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools. | Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent. | Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition. |
| **SCORE 8** | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 **8** 7 6 | 5 4 3 2 1 0 |
| **5. Channel Flow Status** | Water reaches base of both lower banks, and minimal amount of channel substrate is exposed. | Water fills >75% of the available channel; or <25% of channel substrate is exposed. | Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed. | Very little water in channel and mostly present as standing pools. |
| **SCORE 15** | 20 19 18 17 16 | **15** 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| **6. Channel Alteration** | Channelization or dredging absent or minimal; stream with normal pattern. | Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present. | Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted. | Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely. |
| **SCORE 11** | 20 19 18 17 16 | 15 14 13 12 **11** | 10 9 8 7 6 | 5 4 3 2 1 0 |
| **7. Frequency of Riffles** (or bends) | Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important. | Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15. | Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25. | Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25. |
| **SCORE 8** | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 **8** 7 6 | 5 4 3 2 1 0 |
| **8. Bank Stability** (score each bank) Note: determine left or right side by facing downstream. | Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected. | Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion. | Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods. | Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars. |
| SCORE ___**6**___ (LB) | Left 10 9 | 8 7 **6** | 5 4 3 | 2 1 0 |
| SCORE ___**1**___ (RB) | Right 10 9 | 8 7 6 | 5 4 3 | 2 **1** 0 |
| **9. Bank Vegetative Protection** (score each bank) | More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally. | 70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining. | 50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining. | Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height. |
| SCORE ___**5**___ (LB) | Left 10 9 | 8 7 6 | **5** 4 3 | 2 1 0 |
| SCORE ___**2**___ (RB) | Right 10 9 | 8 7 6 | 5 4 3 | **2** 1 0 |
| **10. Riparian Vegetative Zone Width** (score each bank riparian zone) | Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone. | Width of riparian zone 12-18 meters; human activities have impacted zone only minimally. | Width of riparian zone 6-12 meters; human activities have impacted zone a great deal. | Width of riparian zone <6 meters: little or no riparian vegetation due to human activities. |
| SCORE ___**2**___ (LB) | Left 10 9 | 8 7 6 | 5 4 3 | **2** 1 0 |
| SCORE ___**2**___ (RB) | Right 10 9 | 8 7 6 | 5 4 3 | **2** 1 0 |

**HABITAT SCORE**

**87**

| HABITAT SCORES | VALUE |
|---|---|
| OPTIMAL | 160 – 200 |
| SUB-OPTIMAL | 110 – 159 |
| **MARGINAL** | **60 – 109** |
| POOR | < 60 |